

**SUPERFUND STANDBY PROGRAM
New York State
Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010**

SITE ID 285: KILIAN MANUFACTURING CORPORATION

SITE SUMMARY REPORT



**Onondaga Lake Project
Task 5: 104(e) Review**

**Site No. 734030-002
Work Assignment Number D003060-27**

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May 2001

CONTENTS

1.0	SITE DESCRIPTION	1
1.1	Location	1
1.2	Geology	1
1.3	Hydrogeology	2
1.4	Surface Water Hydrology	3
2.0	SITE HISTORY	4
2.1	Owners/Operators	4
2.2	Site Operations	4
2.3	Generation and Disposal of Wastes	8
3.0	POTENTIAL PATHWAYS FOR RELEASE OF HAZARDOUS SUBSTANCES TO THE LAKE SYSTEM	16
3.1	Soil	16
3.2	Surface Water	16
3.3	Groundwater	17
3.4	Air	17
3.5	County Sewer System	18
4.0	LIKELIHOOD OF RELEASE OF HAZARDOUS SUBSTANCES TO THE LAKE SYSTEM	21
4.1	Documented Releases	21
4.2	Threat of Release to the Lake System	23
4.2.1	Extent of Site Contamination	23
4.2.2	Migration Potential of Contaminants	30
5.0	POTENTIAL FOR ADVERSE IMPACTS TO LAKE SYSTEM DUE TO A RELEASE OR THREAT OF A RELEASE	32
5.1	Hazardous Substance Characteristics	32
5.2	Quantity of Substances	35
5.3	Levels of Contaminants	36
5.4	Impacts on Special Status Areas	37
6.0	SUMMARY OF CONCERNS	38
	REFERENCES	40

CONTENTS (Continued)

TABLES

1	Water-based Coolants Used in the CNC Machine	6
2	Summary of Generated Wastes	10

FIGURES

1	Site Location: Kilian Manufacturing Facility	41
2	USGS Syracuse East Quadrangle, Syracuse, New York	42
3	Facility Layout Map and Sewer Locations	43
4	Facility Layout Map and Evacuation Exits	44

1.0 SITE DESCRIPTION

The information referenced in this report was obtained from the 104(e) responses of Kilian Manufacturing Corporation (Kilian, Company ID 2051). Three mailings were received from Kilian dated September 11, 1996, July 1, 1998 and September 15, 2000. Information obtained from other sources is noted, as necessary.

1.1 Location

The Kilian facility is located at 1728 Burnet Avenue in Syracuse, New York in Onondaga County (Site ID 285). The site is bound by Route 690 along the southern perimeter of the property and Burnet Avenue along the northern perimeter of the property. There is an open field along the western boundary of the main building, as shown in a facility layout map provided by Kilian in Mailing No. 1 (p. 000172). The location of the facility in relation to Onondaga Lake is shown in Figure 1 herein. The site location is also shown on the USGS Syracuse East topographic map in Figure 2. Based on the USGS map and the scaled site layout provided (Mailing No. 1, p. 000176), the size of the Kilian site is approximately one acre. However, Kilian stated in a New York State Hazardous Waste Survey (Mailing No. 3, p. 000031) that the size of the manufacturing floor space is approximately 67,000 square feet (1.5 acres).

1.2 Geology

The surficial geology of the Syracuse area was strongly influenced by the most recent glacial advance (Wisconsin age, 12,000 to 14,500 years ago). The area occupies a region that was covered by Lake Iroquois, a large glacial lake situated in front of the ice margin. The broad flat-lying plains situated north from Syracuse to Lake Ontario were formed beneath Lake Iroquois and are characterized by lacustrine fine sand and silt deposits. Additional glacial

features common to the region are moraines, drumlins, U-shaped valleys, and meltwater channels.

Onondaga Lake and all its major tributaries lie within glacial meltwater channels. These features originally were conduits carrying meltwater at large volumes and high velocities away from the glacier. Sediment types characteristically found in meltwater channels are sands and gravels. These relict features form important water bearing and transmitting units which form an irregularly branching, net-like pattern.

The bedrock geology of the greater Syracuse area includes Lower to Middle Paleozoic age sedimentary rocks predominated by carbonate (dolostone and limestone) and shale, and containing some sandstone, siltstone, and evaporites. Bedrock directly beneath the area (as well as underneath Onondaga Lake) is Silurian Vernon Shale (Rickard and Fischer, 1970) which has low permeability, but does possess secondary porosity due to fractures. Soil boring logs were not provided by Kilian.

1.3 Hydrogeology

According to the Syracuse East USGS map, the ground surface elevation at the Kilian facility is approximately 425 feet NGVD (see Figure 2). Groundwater elevation data were not provided by Kilian. Shallow groundwater is expected to flow to the south based on surface contours. The nearest water bodies are Onondaga Creek located west of the Kilian site at approximately 400 feet NGVD and the South Branch of Ley Creek located east of the Kilian site at approximately 400 feet NGVD.

1.4 Surface Water Hydrology

The Kilian facility is located within the Onondaga Lake basin, approximately 3½ miles east of the eastern shore of Onondaga Lake, approximately 2¼ miles east of Onondaga Creek, and approximately 1½ miles west of the South Branch of Ley Creek. Surface contours on the USGS topographic map depict surface water from the Kilian site to likely flow to the south towards I-690 (see Figure 2). It was not indicated in the documents available for review whether any stormwater management features (e.g., berms, swales) were used by Kilian to minimize off-site contamination.

2.0 SITE HISTORY

2.1 Owners/Operators

The Kilian facility (RCRA ID # NYD002225167), which is located at 1728 Burnet Avenue in Syracuse, NY, has been in operation from approximately 1939 to the present (Mailing No. 1, p. 000003). Kilian is a wholly-owned subsidiary of the Torrington Company which is a wholly-owned subsidiary of Ingersoll-Rand Company.

2.2 Site Operations

Kilian manufactures machined ball bearings for various applications (SIC code 3562) and “the types of products manufactured at the facility have not changed substantially since 1939” when Kilian first began its operations (Mailing No. 1, pp. 000003-000004). Kilian provided a site layout in Mailing No. 1 (p. 000172) which indicates the locations of site operations at the facility. This figure is presented herein as Figure 3 and includes handwritten sketches of the facility’s municipal sewer system connection, storage facilities, shipping area, and machining and assembly areas. The wastes that have been generated by Kilian are discussed in Section 2.3. A list of specific manufacturing process operations were submitted in Mailing No. 1 (p. 000004) and supplemental information was provided in Mailing No. 3. These operations are discussed below.

- Metal machining of ball bearing components has occurred during all years of operation and has been conducted utilizing computerized numerical control (CNC) machines, screw machines, and centerless grinding machines (Mailing No. 1, p. 000004). Centerless grinding machines were used to grind the outer portion of ball bearings (Mailing No. 3, p. 000019). It was not indicated when CNC machines were integrated into the system. Water-based, water-soluble coolants are used to run

Kilian's CNC machines. The resultant spent coolants are directed into the ultrafiltration system for treatment prior to discharge into the Onondaga County Department of Drainage and Sanitation (OCDDS) sewer system. Material Safety Data Sheets (MSDS) were submitted for these coolants which are listed in Table 1 (Mailing No. 3, pp. 000044-000105).

- A second operation occurring at this facility involves parts washing of ball bearing components. Kilian stated that parts washing was formerly conducted with the compound Varsol and is presently being conducted with an aqueous solution consisting of soap and water. In the early 1990s, the use of Varsol as a parts cleaning component and water-based coolant was discontinued (Mailing No. 3, p. 000021). The Varsol MSDS was not available for review. Kilian stated that they are presently searching for specific information regarding the use of Varsol.

Other solutions used for parts washing included Safety-Kleen solvents. Kilian stated that Safety-Kleen solvents were used for parts washing, but were replaced with an aqueous cleaner (Mailing No. 3, p. 000021). The years in which the Safety-Kleen solvents were used and then replaced with the aqueous solution was not identified in the documents available for review. However, Safety-Kleen solvent was described by Kilian as a non-hazardous waste that was in use and disposed by Safety-Kleen between 1993 and the present (Mailing No. 1, pp. 000005, 000009). Material Safety Data Sheets for the Safety-Kleen solvents used on-site were provided in Mailing No. 3 (pp. 000119-000140). The MSDS provided in the documents available for review included the following Safety-Kleen solvents: Safety-Kleen 140 Solvent-MS (petroleum distillate and petroleum naphtha), Unocal 142 Solvent 66/3 (volatile solvent), and Safety-Kleen Premium Gold Solvent (petroleum distillates, petroleum naphtha, stoddard solvent, and mineral spirits).

Table 1: Water-based Coolants Used in the CNC Machine

Manufacturer	Compound Name	Indicated Use	Classification/Synonym
Valenite	VALCOOL VNT-920	Metal-working fluid concentrate	NA
Valenite	VALCOOL VAL-U-CLEAN AL	Metal-working machine cleaner	NA
Valenite	VALCOOL VNT 700	Metal-working fluid concentrate	NA
Valenite	VNT 910	Cutting fluid concentrate	NA
Master Chemical Corp.	TRIM 229	Cutting and grinding fluid concentrate used as a coolant and a lubricant in metal removal processes	Chemical fluid/ synthetic fluid
Master Chemical Corp.	TRIM MicroSol 150	Cutting and grinding fluid concentrate used as a coolant and lubricant in metal removal processes	Micro emulsion
Master Chemical Corp.	TRIM Rinse 100	Washing compound concentrate used for removal of metal-working fluids from machine tools and parts	NA
Master Chemical Corp.	TRIM RP 02L	Washing compound concentrate	NA
Master Chemical Corp.	TRIM RP 06	Rust preventative oil used to prevent formation of rust and displace water	EPA hazardous waste D005 (barium)
Master Chemical Corp.	TRIM SOL	Cutting and grinding fluid concentrate used as a coolant and lubricant in metal removal processes	Chemical emulsion/ soluble oil
Master Chemical Corp.	TRIM TC 150	Metal-working fluid additive	Silicon defoamer
Master Chemical Corp.	TRIM TC 177	Metal-working fluid additive	Fragrance compound, odor masking
Master Chemical Corp.	TRIM TC 183	Metal-working fluid additive	Industrial micro biocide
Master Chemical Corp.	TRIM TC 184	Metal-working fluid additive	Non-silicon antifoam
Master Chemical Corp.	TRIM TC 191	Metal-working fluid additive	Non-silicon antifoam
Master Chemical Corp.	TRIM TC 205	Metal-working fluid additive	Extreme pressure lubricant

Table 1: Water-based Coolants Used in the CNC Machine (continued)

Manufacturer	Compound Name	Indicated Use	Classification/Synonym
Master Chemical Corp.	TRIM VHP E200	Cutting and grinding fluid concentrate used as a coolant and lubricant in metal removal processes	Chemical emulsion/soluble oil
Master Chemical Corp.	TRIM VHP E210	Coolant concentrate for heavy duty machining, grinding, and stamping operations	Chemical emulsion/soluble oil

Source: Kilian, Mailing No. 3, pp. 000044-000105

- From 1939 until 1978, metal heat treating of ball bearing components occurred on-site (Mailing No. 1, p. 000004). The heat treating process was used to harden the bearing races and involved heat treating furnaces, salt bathes, and quench tanks (Mailing No. 3, p. 000019). Cyanide waste was a by-product in the salt bathes and quench tanks and was present in heat treat process wastewater. This wastewater was pre-treated prior to its release into the OCDDS sewer system as permitted under Kilian's Industrial Wastewater Discharge Permit No. 2. The method of pre-treatment utilized was described as follows in an Industrial Waste Questionnaire dated June 11, 1980: "Quench water from [the] cyanide salt bath quench tank is pumped to treatment tanks. Cyanide is neutralized with Hypochloride in treatment tanks and then is discharged to sanitary sewers" (Mailing No. 3, p. 000029).
- An on-site ultrafiltration system presently exists at Kilian to allow for pre-treatment of 200 to 300 gallons per day (gpd) of wastewater from metal machining operations (specifically spent coolant from the CNC machines) and parts washing operations prior to disposal into the OCDDS sewer system pursuant to Industrial Wastewater Discharge Permit No. 2 (Mailing No. 1, p. 000011). The ultrafiltration system used at this facility is a Hyde Products Ultrafiltration system equipped with fine membrane filters and carbon filters and was "first implemented in the late 1980s" (Mailing No. 3, p. 000020). Between 1978, when the heat treat process was discontinued, until the

late 1980s, when the ultrafiltration system was first implemented, it is assumed that no pre-treatment of industrial wastewater (metal machining operations and parts washing operations) occurred and all generated wastewater was discharged directly into the OCDDS sewer system.

- Spray painting of component parts occurred in a small paint spray booth until 1987 (Mailing No.1, p. 000004). Information regarding the year this operation began, types of paints used, and waste streams produced were not submitted in the documents available for review.

It has been assumed that unless otherwise noted in the documents available for review, operations occurring at this facility have not changed substantially since 1939.

2.3 Generation and Disposal of Wastes

Wastes generated during process operations were either recycled off-site, discharged to the sanitary sewer system, or transported to an off-site disposal facility. Descriptions of wastes generated and recycled, and locations of off-site recycling and disposal facilities were provided by Kilian for the period from 1987 to the present (Mailing No. 1, pp. 000006-000009; Mailing No. 3, p. 000020).

Information regarding disposal of wastes prior to 1987 was not submitted in the documents available for review. In Mailing No. 2 (p. 000002), it was stated that “Kilian has no additional information [regarding disposal] for years prior to those listed in Kilian’s initial response to question 7 of the joint request.” However, it was noted in Mailing No. 3 (p. 000018) that a Kilian employee indicated on a 1986 NYSDEC Hazardous Waste Disposal Questionnaire (Mailing No. 2, p. 000005) that “the facility did not generate any hazardous waste between January 1, 1952 and December 31, 1981” and that Kilian did not generate

hazardous waste at their facility prior to 1952. However, according to the USEPA/NYSDEC July 26, 2000 supplemental request for information, the USEPA notification of July 1980 indicated that waste types F011 and F012 (spent cyanide solution) were being generated at the facility. Kilian could not clarify “the alleged discrepancy mentioned in the Supplemental Request” because “the person who completed the July 28, 1986 Hazardous Waste Disposal Questionnaire is no longer employed by Kilian” (Mailing No. 3, p. 000018). Kilian also stated that the heat treat operation, which generated the cyanide waste, was shut down in August 1980. After termination of this process operation, Kilian operated a pre-treatment system to treat residual cyanide waste prior to its discharge to the sewer system (Mailing No. 3, p. 000018).

The types of wastes generated, periods of generation, quantities, and disposal or recycling locations are indicated in Table 2 herein. This table (and the summary provided by Kilian) included facilities within and beyond a 50-mile radius of Onondaga Lake (Mailing No. 1, pp. 000005, 000009; Mailing No. 3, p. 000021).

As shown in Table 2, all wastes generated on-site were either recycled or disposed at an off-site recycling or disposal location. Kilian did not submit any information in the documents available for review that indicated that wastes were disposed on-site, however, details regarding disposal methods for years of operation prior to 1980 were not included. It is possible that historical disposal practices may have differed from present and recent practices.

Table 2: Summary of Generated Wastes

Waste	Waste-Generating Process	Year	Volume	Disposal or Recycling Location
Heat Treat Wastewater	Heat Treatment	1976 ¹	1,065 gallons/day	OCDDS
Lab Pack (paints, sprays, greases) (non-hazardous and hazardous)	Maintenance Dept.	Mar. 17, 1973	Data not available	Pollution Solutions of Vermont Williston, VT
Solvents (hazardous)	Metal Machining	1987-1993	800 gallons/year	Solvents & Petroleum Service Syracuse, NY
Metal Chips (non-hazardous)	Metal Machining	1987-Present	3,500,000 lbs/year	A.J. Frank Recycling Facility Hamilton, Ontario
Industrial Sludge	Ultrafiltration	1988-Present	5,000 gallons/year	Data not available
Ultrafiltration Wastewater	Ultrafiltration	1988-Present	10,000 gallons/year	OCDDS
Oil absorbent pads (non-hazardous)	Metal Machining	1991-Present	20,000 lbs/year	Seneca Meadows Landfill Waterloo, NY
Varsol	Parts Washing	Prior to 1993	Data not available	Data not available
Unspecified Wastewater (non-hazardous)	Data not available	1993-1994	4,500 gallons/year	International Petro Recycling Co. Wilmington, DE
Safety-Kleen Solvent (non-hazardous)	Parts Washing	1993-Present	1,500 gallons/year	Safety-Kleen Syracuse, NY
Mineral Spirit (hazardous) (Safety-Kleen solvent as described on MSDS)	Parts Washing	Dec. 21, 1994	900 lbs.	Environmental Enterprises Cincinnati, Ohio
Sludge (hazardous)	Data not available	Dec. 21, 1994	220 gallons	Northeast Environmental Services Wampville, NY
Grinding swarf (hazardous)	Metal Machining	1994-Present	800 lbs/year	Clean Harbors Bristol, CT
Empty Drums (non-hazardous)	Metal Machining	1994-Present	50 drums/year	Clean Harbors Bristol, CT
Parts Washing Wastewater	Parts Washing	1995-Present	20,000 gallons/year	Industrial Oil Tank Verona, NY

Table 2: Summary of Generated Wastes (continued)

Waste	Waste-Generating Process	Year	Volume	Disposal or Recycling Location
Grinding Dust	Metal Machining	Data not available	300 lbs/year	Data not available
Waste coolant	Metal Machining	Data not available	12,000 gallons/year	Data not available
Steel (95% 12L14 steel and 5% 52100 steel)	Ball Bearing Component Production	Data not available	70% of 3,500,000 lbs/year	Data not available

Sources: Mailing No. 1, pp. 000005, 000009; Mailing No. 3, pp. 000019-000021

Notes: 1. The volume was specified for 1976 and this waste was generated from 1939 to 1980.

Results for Toxicity Characteristic Leachate Procedure (TCLP) testing were provided in Mailing No. 1 (pp. 000032-000055). Results were provided for ultrafiltration sludge and solids, unspecified swarf, grinding dust, oil absorbant waste, and grinding swarf sludge. With the exception of the grinding swarf sludge, concentrations of contaminants in these samples were less than the TCLP regulatory limits. The reported TCLP concentration of cadmium (87 mg/L) was significantly higher than the TCLP limit (1 mg/L) (Mailing No. 1, p. 000053). Trichloroethene was detected in the TCLP test of this sample at a concentration (0.43 mg/L) slightly below the TCLP limit (0.5 mg/L). This hazardous waste was disposed by Clean Harbors of Bristol, CT. Additional information regarding the TCLP testing is provided in Section 4.2.1.

The heat treat process was used to harden the bearing races and involved heat treating furnaces, salt bathes, and quench tanks (Mailing No. 3, p. 000019). Kilian indicated that “heat treating of ball bearing components was conducted at the facility until 1978” (Mailing No. 1, p. 000004). However, it should be noted that Kilian indicated in their third submittal that the heat treat process was discontinued in August 1980 (Mailing No. 3, p. 000018). Wastes generated from this process consisted of wastewater containing residual cyanide. Kilian stated that “subsequent to the shut down of the heat treat process, Kilian constructed

and operated a pre-treatment system to treat the residual cyanide waste prior to its discharge as permitted under the Industrial Wastewater Discharge Permit” (Mailing No. 3, p. 000018). An industrial waste questionnaire dated June 11, 1980 described the method of wastewater pre-treatment as follows: “Quench water from [the] cyanide salt bath quench tank is pumped to treatment tanks. Cyanide is neutralized with Hypochloride in treatment tanks and then is discharged to sanitary sewers” (Mailing No. 3, p. 000029). Kilian indicated that as of 1976 the heat treat process generated 1,065 gallons per day of wastewater (Mailing No. 3, p. 000019). It was also noted that quantities of wastewater discharged varied with production schedules and efforts to achieve waste minimization. Two types of cyanide being utilized were mentioned in an Industrial Chemical Survey dated June 10, 1980. The first type was described as “45% cyanide granular” and was used at a rate of 8,500 lbs/yr and the second type, “99% all purpose cyanobrick (cyanide),” was used at a rate of 25,500 lbs/yr (Mailing No. 3, p. 000024). The quantities of these materials that were stored on-site at the time this survey was submitted were 200 pounds of “45% cyanide granular” and 5,400 pounds of “all purpose cyanobrick.”

Wastewater sampling was performed in 1975 and 1976 and is discussed in greater detail in Section 4.2.2. These data are indicative of cyanide constituents in wastewater produced from the heat treat operation (Mailing No. 3, pp. 000036-000037, 000040-000042). A New York State Hazardous Waste Survey dated September 19, 1977 documented that the cyanide waste stream was generated at a rate of 16.7 gpd at an average concentration of 59.2 mg/L (ppm) (Mailing No. 3, p. 000032).

All wastewater generated from process operations, specifically from metal machining of ball bearings and parts washing, are pre-treated in the facility’s Hyde Products Ultrafiltration system prior to discharge into the OCDDS system pursuant to Industrial Discharge Permit No. 2. According to a New York State Hazardous Waste Survey dated September 19, 1977,

there was no “on-site waste water treatment by July 1977” but such a system was in place by July 1983 (Mailing No. 3, p. 000031).

Information regarding waste generated from spray painting operations was not included in the documents that were available for review. Kilian stated that a small paint spray booth was used for spray painting of component parts until 1987 (Mailing No. 1, p. 000004). Kilian did not explicitly state that spray painting occurred since 1939 when manufacturing operations began, therefore the time period in which the operation occurred is unknown. It was not indicated if there were emissions to the atmosphere. Air permits, if any, associated with spray painting operations were not provided in the documents available for review.

Oil absorbant pads are used at Kilian to clean-up “small incidental spills.” Currently, oil absorbants are supplied by the Pig Mat Company, and prior to that, by Speedi-dry (Mailing No. 3, p. 000021). Kilian stated that oil absorbant waste is generated at a rate of 20,000 lbs/yr based on data available from 1995 (Mailing No. 1, pp. 000004-000005). Kilian also included documentation of generation of oil absorbant pad waste at a rate of 20,000 lbs/yr during the period 1991 to present. Kilian did not provide any information in the documents available for review indicating methods used to clean-up spills around equipment prior to 1991. The specific spills that occurred since 1991 were not documented in the material reviewed.

A New York State Hazardous Waste Survey conducted by NYSDEC on September 19, 1977 described a solid waste stream composed of oil-soaked sawdust and miscellaneous office waste produced from the machining of steel parts (Mailing No. 2, p. 000031). The annual waste production was 224 tons per year (Mailing No. 2, p. 000034). This waste was collected and stored in an on-site five cubic yard dumpster until the end of the day. On a daily basis, a waste hauler (E.W. Ellsworth Sanitation Service of Syracuse, NY) transported the waste to an unspecified off-site landfill for disposal (Mailing No. 3, p. 000035).

Facility Permits

Onondaga County Industrial Wastewater Discharge Permit No. 2 was provided by Kilian in Mailing No. 1 and Mailing No. 3 for the period 1981 to 1997 and 2000 to 2003 (Mailing No. 1, pp. 000191-000253; Mailing No. 3, p. 000022). These permits allow for the discharge of process wastewater from the ultrafiltration system (see Section 2.2) as well as sanitary wastewater to the OCDDS sewer system. A permit for Kilian's industrial wastewater discharge was not obtained from 1997 to 2000 because Kilian rescinded their discharge permit in April 1997. This was done as a result of the elimination of their ultrafiltration system and its subsequent replacement with a Wastewater Evaporation System (Mailing No. 3, pp. 000143-000145). The Wastewater Evaporation System was designed to evaporate all process wastewater in a closed-looped system thus eliminating process wastewater from entering the OCDDS system. The only wastewater stream discharged to the OCDDS system at that time was sanitary wastewater for which a permit is not required. However, Industrial Wastewater Discharge Permit No. 2 was provided (first page only) for the period April 21, 2000 to April 21, 2003 (Mailing No. 3, pp. 000146-000148). The reason this permit was re-issued for this period is not stated in the documents available for review.

Kilian does not explicitly document on-site storage of generated wastes or chemicals required for process operations. However, a NYSDEC Petroleum Bulk Storage Registration Certificate was included in Mailing No. 1 (p. 000189). This certificate approves use of above-ground storage tanks (ASTs) for storage of petroleum in steel/carbon steel tanks. Two tanks were used for petroleum storage with capacities of 5,000 gallons and 3,000 gallons. Other than the ASTs used for storage of petroleum, it is likely that storage of cleaning and conditioning wastes occurred on-site, although this is not stated by Kilian in the documents reviewed. Generated wastes shipped off-site for disposal were most likely drummed and stored on-site until a waste hauler transported them to an off-site disposal location. It can be inferred from Mailings No. 1 and No. 3 that cleaning and conditioning products were

stored on-site prior to use in metal machining or parts washing equipment and generated wastes were drummed prior to disposal at an off-site facility.

Three NYSDEC air permits were provided for the discharge of particulate wastes from steel grinding operations at a rate of 4 lbs/yr from emission points 0001C, 0002C, and 0003C for the years 1982 through 1992 (Mailing No. 1, pp. 000183-000188). Each of these three permits indicates that the disposal method for control equipment (cyclone) wastes is "landfill-onsite." Kilian did not provide any information related to this on-site disposal of waste. A fourth air permit was provided for the period 1995 through 2000 for emission points 4 and 5 which permitted the release of fumes from the quality control laboratory and fumes from the assembly work station (Mailing No. 1, pp. 000186-000187). Information regarding the characteristics and discharge amounts from these two emission points was not provided in the documents reviewed.

3.0 POTENTIAL PATHWAYS FOR RELEASE OF HAZARDOUS SUBSTANCES TO THE LAKE SYSTEM

3.1 Soil

Soil at the Kilian site could have been contaminated directly from on-site storage or disposal of wastes and cleaning and conditioning products, spills or leaks from waste storage or process operation areas, leaks from sewers and pipelines, and from routine maintenance activities. These potential pathways of contamination have been identified based on facility operation information, waste manifests, reported spills and notices of violations issued by OCDDS. Soil data for this site were not included in the documents available for review.

3.2 Surface Water

The Kilian site is located approximately 2¼ miles east of Onondaga Creek, 1½ miles west of the South Branch of Ley Creek, and 3½ miles east of Onondaga Lake, as shown on Figure 1. Stormwater runoff management practices were not indicated in the documents available for review. Kilian did not explicitly state or identify locations where drums of waste or cleaning and conditioning products have been stored. However, they do report annual shipments, approximately 50 empty drums, to Clean Harbors located in Bristol, Connecticut since 1994 (Mailing No. 1, p. 000009). It has been inferred that drums containing wastes or cleaning and conditioning products are stored on-site during facility operations until they are transported off-site for recycling or disposal. Spills and leaks of materials from on-site drum storage areas and unpermitted releases from process operations are potential sources of contamination to off-site surface waters. Surface contours indicate that runoff would most likely flow to the south of Kilian towards I-690 and not in the direction of Ley or Onondaga creeks. Documented discharges, spills, and leaks are discussed in Sections 4.1 and 4.2.1. The site is bordered by paved roadways adjacent to the facility to the south (I-690) and north

(Burnet Avenue), and it was not indicated whether there are roadway stormwater management structures (e.g., drainage ditches, swales, catch basins) in place. A shipping area exists along the northern boundary of the process operations building as shown on Figure 3 herein (Mailing No. 1, p. 000172). West of the shipping area is an open field. It is not known if the shipping area is paved and bermed or contains stormwater drains or ditches to convey any materials that may have spilled or leaked out of drums or containers during loading and unloading operations.

Kilian stated in Mailing No. 2 (p. 000002) that "...[they have] determined that there was never any direct discharge of sanitary or industrial wastewater or stormwater to the lake or any of its tributaries from the Kilian facility."

3.3 Groundwater

Groundwater at the Kilian site can be impacted directly by leaching of chemicals from manufacturing, storage, and processing areas or deteriorated sanitary sewers throughout the site, or from spills originating in processing, waste storage or handling areas. The on-site sewer connection between the ultrafiltration system and the OCDDS sewer system is shown on Figure 3 herein. The ultrafiltration system's connection to the sewer as well as the shipping area were identified as potential sources of contamination based on facility practices and reported spills. No groundwater data were provided for this site in the documents available for review.

3.4 Air

Air emissions represent a local source of contaminants to the atmosphere with potential deposition to the ground surface and subsequent transport to Onondaga Lake via surface water runoff. There were five emission points discussed in the Kilian mailings, all of which

were permitted by NYSDEC. These emission points are not shown on the facility map, however, the process operations that generate these emissions are noted on the air permits (Mailing No. 1, pp. 000183-000187).

Based on the permits provided, particulates were permitted to be discharged from Emission Points 0001C, 0002C, and 0003C which were located in the machine tools steel grinding area. Particulates were permitted to be released from these three emission points at a rate of 4 lbs/yr. An air permit for two additional emission points was obtained in June 1995 (Emission Point 4 and Emission Point 5). The permit provided in Mailing No. 1 (pp. 000187-000188) does not specify the emitted pollutants for these two sources. The permit states that Emission Point 4 is located in the fume hood used for the "quality control laboratory." Emission Point 5 is located in the fume hood located at the "assembly work station." It is possible that these two emission points are located in the areas labeled "QA Dept." for Emission Point 4, and "Assembly" for Emission Point 5, as shown on Figure 4 herein.

3.5 County Sewer System

Kilian discharges its industrial and sanitary wastewater to the OCDDS sanitary sewer system pursuant to pre-treatment requirements established by Industrial Wastewater Discharge Permit No. 2. Sanitary and industrial wastewater have been conveyed from the facility through Sewer No. 1. The following types of wastewater have been discharged into the sanitary sewer from Kilian: process wastewater from the ultrafiltration system (1990 to present), process wastewater from parts washing operations (1939 to 1990), wastewater from the heat treat operation (1939 to 1980), and sanitary wastewater for all years of operation (1939 to present). As noted in Section 2.3, OCDDS Industrial Wastewater Discharge Permits were provided from 1981 through 1989; 1989 through 1992; 1994 through 1997; and 2000 through 2003. There are time gaps for which no permits were provided. A permit for industrial wastewater discharge was not obtained following January 1, 1997 because Kilian

rescinded their discharge permit at that time. This was done as a result of the elimination of their ultrafiltration system and its subsequent replacement with a Wastewater Evaporation System (Mailing No. 3, pp. 000143-000145). However, the permit was reissued in 2000 for an unspecified reason.

The location of the main trunk line flowing through the Kilian site and its connection to the municipal sewer line that is directed into the OCDDS sewer system and ultimately to the Metropolitan Wastewater Treatment Plant (METRO) are shown on Figure 3 herein. According to this figure, sanitary and industrial wastewater flows to the north through the facility until its confluence with the municipal sewer line where it then flows in a westerly direction towards METRO where it is then treated prior to discharge into Onondaga Lake.

OCDDS sewer sampling results from 1975 and 1976 (see Section 4.2.1) along with sampling data summarized in a New York State Hazardous Waste Survey for the period January 1975 through December 1976 were the only data provided regarding wastewater quality prior to 1980. OCDDS permits submitted by Kilian specified daily allowable and instantaneous allowable effluent limits for the following constituents: total cadmium; total chromium; hexavalent chromium; total copper; total lead; total mercury; total nickel; total silver; total zinc; total cyanide (1981 to 1989); total phenolic compounds; 5-day biochemical oxygen demand (BOD₅); total suspended solids (TSS); total Kjeldahl nitrogen (TKN); total phosphorus; oil and grease; pH; and temperature (Mailing No. 1, p. 000201). Self-monitoring reports prepared by Kilian for years coincident with the OCDDS permits were not submitted in the reports available for review for the years 1981 through 1987. However, OCDDS quarterly monitoring analytical data were submitted for the period from 1987 through 1996 and semi-annual sewer monitoring analytical data were submitted for the period from 1990 through 1996 (Mailing No. 1, pp. 000056-000101, 000117-000170). In addition, Toxicity Characteristic Leachate Procedure (TCLP) results were submitted in Mailing No. 1 for sludge generated from wastewater in the ultrafiltration process (pp.

000032-000039), grinding swarf waste (pp. 000040-000044), grinding dust waste (pp. 000049-000050), and grinding swarf sludge (p. 000053). These analytical data are presented in Section 4.2.1. OCDDS Notices of Violations (NOVs) are summarized in Section 4.1.

It is possible that stormwater runoff drains into storm sewers along Burnet Avenue or I-690 or into the OCDDS sewer system or that potentially contaminated groundwater infiltrates into the sewer system. Information regarding the site storm sewer system, if present, was not included in the documents available for review. No specific information regarding stormwater quality or stormwater runoff management at the Kilian site was provided in the documents available for review.

4.0 LIKELIHOOD OF RELEASE OF HAZARDOUS SUBSTANCES TO THE LAKE SYSTEM

4.1 Documented Releases

Documented Spills

Descriptions of spills at the Kilian site were not included in the documents available for review. Kilian stated in Mailing No. 1 (p. 000011) that “to the best of our knowledge, there were never any direct discharges of sanitary or industrial wastewater or stormwater to the Lake or any of its tributaries from the Kilian facility.” Although NYSDEC spill reports were not included in the documents available for review, it is possible that spills could have resulted from on-site storage and handling of chemicals and/or wastes.

In a New York State Hazardous Waste Survey prepared by NYSDEC’s Division of Solid Waste Management, dated September 19, 1977, cyanide is documented to be “on-floor” at a rate of 35 gallons/week (Mailing No. 3, p. 000031). It is not indicated in the documents available for review whether this was the amount of cyanide used in the manufacturing process at that time (i.e., inventory) or the amount released (spilled) at the facility. If this was released, the location of this spill, method of release, period of release and containment and clean-up measures taken by Kilian were not noted in the documents available for review. Kilian indicated that small spills occur periodically near machines at their facility (Mailing No. 3, p. 000021). These spills are cleaned up using oil absorbant pads. Analytical results of an oil absorbant waste sample collected in December 1994 by Kilian (Mailing No. 3, pp. 000141-000142) suggests that a spill occurred on-site at about that time. The precise location and quantity of material spilled are not indicated, however the analytical data showed the presence of cadmium but at a concentration less than the TCLP regulatory limit. Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and

pesticides/herbicides were not detected in this TCLP waste sample. Kilian stated that no information regarding the quantity of these spills is available, however oil absorbants have been used to clean-up these spills (Mailing No. 3, p. 000021).

Ongoing/Recent Releases

There were no ongoing releases indicated in the documents available for review other than permitted releases into the OCDDS sewer system and into the atmosphere. There is no indication of the occurrence of on-site disposal of wastes in the documents Kilian provided with the possible exception of the on-site disposal of cyclone wastes as indicated in the NYSDEC air permits (Mailing No. 1, pp. 000183-000184). Kilian provided documentation of two violations of the OCDDS permit which occurred in 1994 and 1995 as well as analytical data collected by OCDDS that are representative of the wastewater quality during 1975, 1976 and from 1986 through 1996. Presently, releases from this facility consist of pre-treated wastewater discharged into the OCDDS sewer system and industrial and hazardous wastes disposed at off-site facilities as previously discussed in Section 2.3.

Information regarding two NOV's of the OCDDS permit were provided by Kilian for the period 1994 and 1995. In an August 3, 1994 letter to Kilian, OCDDS indicated that Kilian violated the pH limits in their permit (Mailing No. 1, p. 000118). The OCDDS letter indicated that the permitted pH range (5.5 to 9.5) was violated on five occasions between June 26 and June 30, 1994. Measured pH was as high as 10.2 (June 26) and as low as 3.0 (also on June 26). In response to this NOV, Kilian conducted an internal investigation in August 1994 and determined the reason for the pH violations to be a cleaning product known as "Sparding" (Mailing No. 1, p. 000122). Kilian indicated that "this product has a pH level of <1, this explains our low readings" (Mailing No. 1, p. 000122). It was noted in the NOV response prepared by Kilian that the use of this product was discontinued after this violation occurred. Kilian also stated in the NOV response form that the MSDS and invoice for this

cleaning product (Sparding) were attached, however, these documents were not included in the material reviewed. The pH strip charts from August 1994 (Mailing No. 1, pp. 000124-000137) indicate that pH levels generally returned to acceptable levels, with the exception of a low pH (2.0) on August 3.

On November 1, 1995, Kilian received a NOV for a May 3, 1995 exceedance of lead at Sewer No. 1. Sampling at this sewer showed a lead concentration of 3.62 mg/L (permitted lead concentration of 1 mg/L) (Mailing No. 1, p. 000103). OCDDS required Kilian to sample and analyze wastewater from Sewer No. 1 for total lead for four consecutive days of typical production. Kilian conducted the required sampling for the period November 14, 1995 through November 18, 1995. Sampling results showed total lead concentrations to be less than 0.1 mg/L for each of these four days and Kilian was unable to explain the cause of the violation (Mailing No. 1, p. 000107). Kilian stated that "Ultrafiltration and monitoring equipment was inspected by Kilian maintenance personnel and contractors. Everything seemed to be functioning correctly" (Mailing No. 1, p. 000107). Kilian indicated that all membranes and filters used in the ultrafiltration system were replaced as a precautionary measure.

4.2 Threat of Release to the Lake System

4.2.1 Extent of Site Contamination

The documents submitted by Kilian for review include analytical data for the grinding swarf produced during the metal finishing process, Safety-Kleen solvent waste used in the parts washing process operation, ultrafiltration system sludge, bag filter solids and wastewater, and oil absorbant pads used to clean-up small spills around machines. Analytical data collected by OCDDS were also submitted from sampling of process wastewater discharges to the sewer for 1975 to 1976, and 1986 through 1996. These data are presented below. No

data were submitted by Kilian for the sampling of soil, surface water or groundwater on-site, however, a discussion of possible surface water contamination is provided below.

Grinding Swarf

Grinding swarf is generated as a non-hazardous waste product from the grinding machines as stated in a Clean Harbors Waste Material Profile Sheet provided in Mailing No. 3 (p. 000112). The swarf consists of metal dust (50-60%), water (10-20%), and coolants (10-20%) and is produced at a volume of one drum per month. Sampling data were presented for this swarf waste for a sample collected on February 28, 1990. EP toxicity results for this sample indicate that concentrations of metals were less than the regulatory limits (Mailing No. 3, p. 000107). Results for a grinding swarf sample collected in 1992 (Mailing No. 1, p. 000041) indicate that PCBs were not detected in this waste. Results for a sample collected in 1994 indicate that VOCs, SVOCs, pesticides and herbicides, and metals were detected at levels less than the regulatory limits (Mailing No. 3, p. 000113). According to the Clean Harbors Profile Sheet, this is a continuous waste stream being produced at a volume of one 55-gallon drum per month and is disposed at an off-site location as discussed in Section 2.3.

Kilian also provided analytical data for a TCLP sample of the grinding swarf sludge, a by-product of the machining of metal parts (Mailing No. 3, pp. 000109, 000117). This waste stream is composed of metal grinding swarf (> 80%), water (5-10%), and coolants (5-10%). Unlike the grinding swarf, this waste is considered a USEPA hazardous waste (identification number D006) and is classified as a Hazardous Waste Solid, NOS (cadmium) (Mailing No. 3, p. 000116). According to the Clean Harbors Waste Material Profile Sheet, this waste was produced on a one-time basis (December 21, 1994, Mailing No. 3, p. 000109) at a volume of 60 gallons (two 30-gallon drums, Mailing No. 3, p. 000116). Cadmium was the only constituent detected above TCLP regulatory limits at a concentration of 87 mg/L (TCLP

regulatory limit of 1 mg/L). Results also indicated detections of chromium, lead, nickel, zinc and trichloroethene that were all below TCLP limits (Mailing No. 3, p. 000109).

Safety-Kleen Solvent Waste

Analytical data were presented for Safety-Kleen Solvent 150 which is used in the parts washing process as discussed in Section 2.3. This solvent sample was collected in December 1994 and analyzed for the following parameters: VOCs, SVOCs, total metals, pH, flash point, and RCRA reactivity (Mailing No. 3, p. 000118). The data were reported in solids units (i.e., mg/kg). VOCs and SVOCs were not detected although reported detection limits are high (150 mg/kg for VOCs and 500 to 1,000 mg/kg for SVOCs). Detected metals include barium (4 mg/kg), chromium (0.3 mg/kg), and lead (9.4 mg/kg). It should be noted that there was a violation of the OCDDS permit in May 1995 for an exceedance of the discharge limit for lead (see Section 4.1). Although it is believed that solvents were properly disposed off-site (see Table 2), it is possible that unpermitted releases of these solvents caused this violation.

Ultrafiltration System Sludge, Bag Filter Solids, and Wastewater

Analytical data for various components of the ultrafiltration system used to pre-treat industrial wastewater prior to discharge to the OCDDS system were provided by Kilian. Sludge from the ultrafiltration system's carbon canister was sampled for EP toxicity metals on June 4, 1990 (Mailing No. 1, p. 000033). Detected metals include arsenic (0.047 mg/L), barium (2.3 mg/L), cadmium (0.054 mg/L), chromium (0.06 mg/L), and lead (0.4 mg/L), however, these concentrations were less than the EP toxicity limits. This sludge was disposed of at an off-site location as discussed in Section 2.3. A TCLP analysis was performed for VOCs, SVOCs, and metals for the pre-ultrafiltration bag filter on June 4, 1990 (Mailing No. 1, p. 000034). Both TCLP VOCs and TCLP SVOCs were not detected. The

following metals were detected at concentrations less than the TCLP limits: arsenic (0.022 mg/L), barium (1.0 mg/L), cadmium (0.05 mg/L), chromium (0.13 mg/L), and lead (1.0 mg/L). Solids collected in the pre-ultrafiltration bag filter are disposed at an off-site facility as discussed in Section 2.3. Sampling during this period also included analysis of wastewater from the ultrafiltration system's pre-carbon system. This discharge was sampled and analyzed for pH, BOD₅, total hydrocarbons, and VOCs (Mailing No. 1, pp. 000035-000037). VOCs, gasoline/oil, and BOD₅ were not detected. Total hydrocarbons were reported at a concentration of 12 mg/L and pH was reported at 9.2.

Oil Absorbant Pads

Analytical data were presented in Mailing No. 3 (p. 000141) for an oil absorbant used to clean up a small spill near equipment in December 1994. It has been inferred that the oil absorbant data were from a small spill surrounding operating and/or processing equipment based on Kilian's response that depicts the use of oil absorbant pads "...[for] small incidental spills near machines" (Mailing No. 3, p. 000021). The nature and location of the spill and the location where the oil absorbant was used were not indicated in the documents reviewed. Analytical results of a TCLP sample of this waste indicate that cadmium was detected at a concentration (0.02 mg/L) less than the TCLP limit. Other metals, TCLP VOCs, and TCLP SVOCs were not detected (Mailing No. 3, p. 000141). As stated in Section 2.3, oil absorbant pads were disposed of at an off-site location.

Sewer Discharges

As stated in Section 2.3, sanitary wastewater and industrial wastewater generated from metal finishing processes, the heat treat process, and from the ultrafiltration system have been discharged into the OCDDS sewer system. Wastewater sampling data collected at Sewer No. 1 by the OCDDS were provided for the following years: 1975 to 1976 (Mailing No. 3, pp.

000036-000042), and 1986 to 1996 (Mailing No. 1, pp. 000057-000101, 000122-000170). These data are discussed below.

Prior to 1980, Kilian operated a pre-treatment system to treat cyanide waste formed during the heat treat operation. As discussed in Section 2.2, cyanide waste was a result of cyanide solutions used in a salt bath for pot cleaning during the heat treat process. Cyanide waste was treated in a pre-treatment system which used hypochloride to neutralize cyanide concentrations prior to its discharge into the OCDDS system under Industrial Wastewater Discharge Permit No. 2 (Mailing No. 3, p. 000029). The heat treat operation was discontinued in 1980, thus eliminating a cyanide input to the OCDDS sewer system.

Sampling data collected by OCDDS were included for the period 1975 to 1976 (Mailing No. 3, pp. 000036-000042). Results from a 1975 Onondaga County Industrial Waste Monitoring Program report include analytical data for April, May, June, August, October, and December. During this period, the maximum concentration of cyanide was reported as 197 mg/L in May 1975 with pH ranging from 9.2 to 10.5 (Mailing No. 3, pp. 000040-000042). Sampling data were also provided for the period February through July 1976 as part of the 1976 Onondaga County Industrial Waste Monitoring Program report. During this period, cyanide was detected at a maximum concentration of 85.7 mg/L in July 1976 (Mailing No. 3, pp. 000036-000037). The OCDDS limit for cyanide was not provided in the documents available for review for the years 1975 to 1976. The total cyanide limits reported in the OCDDS permit for 1994 to 1997 are 2.0 mg/L for daily allowable concentration and 3.0 mg/L for instantaneous allowable concentration (Mailing No. 1, p. 000201). However, NOVs for these cyanide exceedances were not included in the documents reviewed.

Additional data for this period were provided in a New York State Hazardous Waste Survey dated September 19, 1977. The survey indicates that the average cyanide concentration from 1975 to 1976 was 59.2 mg/L (Mailing No. 3, p. 000032). Other parameters analyzed were

TSS (332 mg/L average), total organic carbon (265 mg/L average), BOD₅ (165 mg/L average), and pH (7.7 to 10.5). This survey documented the quench tank overflow wastewater containing the residual cyanide to be generated at a volume of 16.7 gallons per day (gpd) and approximately 4,000 gallons per year.

Quarterly monitoring sampling data were provided by Kilian for the years 1986 to 1990 and 1992 to 1995. In March, June, August, and September 1986, samples were collected at Sewer No. 1 and analyzed for the following parameters: pH, BOD₅, TSS, phosphate (PO₄) and cyanide (Mailing No. 1, pp. 000168-000170). Limits for these constituents were not stated by OCDDS in the wastewater discharge permit for the period August 1986 through August 1989 (Mailing No. 1, pp. 000234-000241). The average flow during this period was 20,500 gpd and the maximum concentration of cyanide was 0.06 mg/L (Mailing No. 1, pp. 000169-000170). In 1987, samples were collected during the months of May, September, and November and samples were also analyzed for BOD₅, TSS, PO₄, and cyanide (Mailing No. 1, pp. 000159-000160). Limits were not provided in the OCDDS permit for this period. The average flow for this period was not indicated on these pages. The maximum concentration of cyanide was 0.03 mg/L (Mailing No. 1, p. 000160). In 1988, OCDDS collected samples in June, October, and November (Mailing No. 1, pp. 000165-000167). The average flow during this period was 15,500 gpd (Mailing No. 1, p. 000165). The samples were analyzed for BOD₅, TSS, and PO₄. Kilian did not exceed any OCDDS limits at this time (Mailing No. 1, pp. 000234-000241). In 1989, sampling data were obtained in February, July, and November. Samples collected were analyzed for pH, BOD₅, TSS, and PO₄ (Mailing No. 1, pp. 000161-000163). Concentrations of these parameters did not exceed OCDDS limits at this time (Mailing No. 1, pp. 000234-000241). The average flow during this period was 13,600 gpd (Mailing No. 1, p. 000163). It should be noted that it is believed that the flow data reported on the OCDDS reports are in units of thousand gallons per day (Mailing No. 1, p. 000164). Thus, a flow shown as 13.6 is believed to be 13,600 gpd.

Monitoring data were also provided by Kilian for the years 1990 through 1996 (Mailing No. 1, pp. 000056-000101, 000122-000157). Samples collected from Sewer No. 1 were analyzed for the following parameters: pH, BOD₅, total Kjeldahl nitrogen (TKN), TSS, total phosphorus, total metals, and oil and grease. The average annual flow in this period ranged from a high of 15,700 gpd in 1990 (Mailing No. 1, p. 000155) to a low of 3,207 gpd in 1995 (Mailing No. 1, p. 000138). From 1990 to 1996, only two exceedances were identified for which Kilian subsequently received NOV's. These exceedances included a pH violation in 1994 and a lead violation in 1995. These NOV's issued by OCDDS are discussed in Section 4.1.

Surface Water

Spills or leaks at the various on-site chemical and waste storage areas or from process operations could have impacted on-site or off-site surface waters. The closest surface water body is the South Branch of Ley Creek, located approximately 1½ miles east of the Kilian site. Onondaga Creek is located approximately 2¼ miles west of the site and Onondaga Lake is approximately 3½ miles west of the site. No information was provided in any of the mailings regarding SPDES permits, or the general direction of stormwater runoff on the site. As noted in Section 1.4, surface contours on the USGS Syracuse East topographic map depict a likely surface water flow from the Kilian site to the south towards I-690 (Figure 2).

Although no NYSDEC spill reports were provided in the documents available for review, an apparent spill of cyanide onto the floor during process operations at a rate of 35 gallons per week was documented in a NY State Hazardous Waste Survey dated September 19, 1977 (Mailing No. 3, p. 000031). Methods of containment and clean-up of the cyanide were not discussed in the hazardous waste survey.

As stated earlier, Kilian concluded in Mailing No. 1 (p. 000011) that “to the best of our knowledge, there were never any direct discharges of sanitary or industrial wastewater or stormwater to the Lake or any of its tributaries from the Kilian facility” however, “...prior to 1981, Kilian did not pretreat or filter its wastewater or stormwater discharge” (Mailing No. 2, p. 000002). Surface water sampling data were not included in the documents available for review. NYSDEC’s 1996 and 1997 sediment sampling data from the South Branch of Ley Creek and Onondaga Creek were not reviewed for this report due to the large distances from the Kilian site to these creeks and the presence of other industrial sites closer to these creeks.

4.2.2 Migration Potential of Contaminants

The potential contaminants of concern at the Kilian site are cyanide and lead. Cyanide was discharged into the sanitary sewer in heat treat process wastewater for an unknown number of years prior to 1980. Concentrations historically discharged were well above current OCDDS limits. Also, it is documented in a hazardous waste survey (Mailing No. 3 , p. 000031) that cyanide was apparently released onto the floor at a rate of 35 gallons per week. Containment measures and clean-up measures, if any, were not discussed in the documents available for review and it is possible that site soils, groundwater or surface water could have been impacted. Lead was a by-product of metal finishing operations and was present in industrial wastewater. A NOV was issued for lead in 1995 due to its detection at concentrations greater than the OCDDS limit. Kilian was unable to explain the high concentrations of lead during these sampling events. Kilian stated that the ultrafiltration equipment seemed to be functioning correctly, however, all filters and membranes were replaced as a precautionary measure (Mailing No. 1, p. 000107).

Kilian did not describe any methods of containment or diversion of surface water runoff in the documents reviewed. It is possible that spills or leaks associated with on-site storage practices and process operations have resulted in contaminant migration via groundwater or

surface water runoff. It is also possible that contaminants could have migrated off-site from air transport and deposition. Environmental analytical data (soil, groundwater, surface water) were not provided by Kilian in the documents reviewed.

5.0 POTENTIAL FOR ADVERSE IMPACTS TO LAKE SYSTEM DUE TO A RELEASE OR THREAT OF A RELEASE

5.1 Hazardous Substance Characteristics

Based on information provided by Kilian, the potential contaminants of concern which have been identified are cyanide and lead. The sources of contamination identified at the Kilian site are wastewater from the heat treat operation, ultrafiltration system and metal finishing operations which have been discharged to the sewer system. Contamination may have also resulted from undocumented spills, on-site disposal of air control equipment (cyclone) waste, leaking of drums containing waste or conditioning and cleansing products, or leaks from on-site sewer pipes.

A discussion of hazardous substance characteristics for the potential contaminants of concern, cyanide and lead, is provided below.

Mobility

Hydrogen cyanide (HCN) is the most common of the cyanides and can be removed from solution by volatilization or adsorption (USEPA, 1979). As an ion, cyanide can react with certain metals to produce insoluble metal cyanides. In natural waters with a pH less than 8, more than 93% of the free cyanide in solution is present as HCN, which is highly volatile (USEPA, 1979). Such low pHs have been detected in wastewater generated at Kilian, including a pH as low as 3.0 measured in June 1994 (Mailing No.1, p. 000118). Cyanides are also sorbed by clays, suspended sediments, biological solids, and activated carbon. HCN is not strongly partitioned to suspended matter due to its high solubility in water. In the soil environment, cyanides are considered fairly mobile, as the degree of mobility increases at high pH and low clay content (USEPA, 1979).

Lead mobility in the environment is governed by a number of environmental conditions such as pH, oxidation state, and water hardness. Elemental lead (metallic lead) may also have been present as a result of the processes which occurred on site. However, natural weathering is ultimately expected to oxidize any elemental lead. It should be noted that wastewater from Kilian exhibited elevated levels of lead. There is a possibility that structural degradation of the sewer could have caused a leak which would result in wastewater, and possible elevated levels of lead, leaking into the soil or groundwater. Lead mobility in oxidized and elemental form is expected to be controlled by lead-bearing soil particle movement. As a result, site lead, if present, will be associated with soil particles and lead mobility will, in part, be governed by the same processes responsible for soil movement, i.e., surface water flow, particle size and depositional environment.

Toxicity

Cyanide is highly toxic in all forms, although hydrogen cyanide is the most toxic of cyanide compounds. The central nervous system is the target for cyanide toxicity in humans and animals following ingestion, inhalation, or dermal contact. Acute exposure to high levels of cyanide leads quickly to death, following convulsions and central nervous system depression (USEPA, 1979). No studies have been conducted regarding carcinogenic effects of exposure to cyanide (USDHHS, 1991).

Lead may adversely affect survival, growth, reproduction, development, and metabolism of most species under controlled conditions, but its effects are substantially modified by physical, chemical, and biological variables (Eisler, 1988). In general, organo-lead compounds are more toxic than inorganic lead compounds, food chain biomagnification of lead is negligible, and immature organisms are most susceptible to toxicity.

Lead is classified as B2, a probable human carcinogen, based on rat and mouse studies with dietary and subcutaneous exposure to several soluble lead salts (USEPA, 1995). In humans,

ingestion of lead leads to symptoms such as loss of appetite, anemia, malaise, insomnia, headaches, irritability, muscle and joint pains, tremors, hallucination and distorted perceptions, muscle weakness, gastritis and liver changes. Ingestion also produces cardiac lesions and abnormalities in electrocardiograms. There is evidence of teratogenicity in fetuses when pregnant women are exposed to lead and exposed fetuses may exhibit neurobehavioral dysfunctions. Studies for mutagenicity have determined that lead causes structural chromosomal aberrations. Lead is also toxic to all phyla of aquatic biota, but its toxic action is modified by species and physiological state. Wong et al. (1978) reported that only soluble waterborne lead is toxic to aquatic biota, and that free cationic forms are more toxic than complexed forms.

Persistence

Cyanide compounds are subject to biodegradation and volatilization, and therefore, are generally not persistent. However, biodegradation is dependent upon cyanide concentrations, pH, temperature, concentration of microbes, availability of nutrients, and microbe acclimation to cyanide (USEPA, 1979). For example, cyanides have been detected in groundwater at a limited number of landfills. At high concentrations in landfills, cyanides can become toxic to soil organisms, preventing biotransformation and increasing the potential for leaching into groundwater (USDHHS, 1991).

Lead is very persistent in both water and sediment. Lead is an element and cannot be broken down at all and its concentrations in environmental media are governed solely by dilution mechanisms. In the environment, lead can be transformed from inorganic to organic forms, affecting its toxicity, but ultimately only dilution or removal affect the presence of this element.

Bioaccumulation

Bioaccumulation of metal cyanide complexes in fish has been documented. Hydrogen cyanides generally do not bioaccumulate, as they are either metabolized quickly by the organism, or result in death of the organism due to high toxic levels (USEPA, 1979).

Lead tends to bioaccumulate/bioconcentrate within living organisms. However, there is no convincing evidence that it is transferred through food chains (Wong et al., 1978; USEPA, 1979; Settle and Patterson, 1980). In surface water, lead concentrations are usually highest in benthic organisms and algae and lowest in upper trophic level predators (e.g., carnivorous fish).

5.2 Quantity of Substances

Estimates of the quantities of hazardous and non-hazardous wastes disposed off-site are presented in Section 2.3 and Table 2. Cyanide, which was produced as a by-product of the heat treat operation, was identified as a potential contaminant of concern due to its presence in process wastewater at elevated concentrations during years of operation prior to 1980 and due to an apparent spill described in a NYSDEC hazardous waste survey. This survey suggests that 35 gallons per week of cyanide were spilled onto the floor. Methods of clean-up and containment were not described leaving a concern for the potential release of cyanide into the sewer system or the environment through floor drains. The presence of floor drains and the fate of the cyanide were not discussed by Kilian.

Cyanide was detected at an average concentration of 59.2 mg/L during the period January 1975 through December 1976 (Mailing No. 3, p. 000032). The average process flow for this period of time was noted to be 17,000 gpd (Mailing No. 3, p. 000026). Based on this flow and the average cyanide concentration of 59.2 mg/L, an estimate of the loading of cyanide

to the sewer system is 8 lbs/day. The maximum reported cyanide concentrations in 1975 and 1976 were 197 mg/L and 85.7 mg/L, respectively.

Lead was detected at elevated concentrations in wastewater following treatment in the ultrafiltration system. As previously discussed (see Sections 4.1 and 4.2), lead was found to exceed the OCDDS limit at a concentration of 3.62 mg/L (Mailing No. 1, p. 000103). This detection occurred on May 3, 1995 when the wastewater flow rate from Sewer No. 1 was recorded at 11,024 gpd (Mailing No. 1, p. 000138). Based on this flow and the lead concentration of 3.62 mg/L, an estimate of the loading of lead to the sewer system on this day is 0.33 lb/day.

Quantities of particulates released to the environment via air emissions are documented in Section 3.4.

5.3 Levels of Contaminants

The apparent release of cyanide at a rate of 35 gallons per week onto the floor was documented in a hazardous waste survey dated 1977 (Mailing No. 3, p. 000030). Analytical data of cyanide concentrations present in this weekly discharge were not available in the documents reviewed. In addition, residual cyanide was present in wastewater generated from the heat treat operation which occurred at this facility from 1939 until 1980. Levels of cyanide present in wastewater discharged into the OCDDS system are presented in Sections 4.2.1 and 5.2.

An elevated concentration of lead was detected during routine sewer sampling conducted at Sewer No. 1 in 1995. Kilian received a NOV due to the presence of lead in process wastewater at a concentration that exceeded the OCDDS limit. These data are presented in Sections 4.1 and 5.2.

Analytical data from on-site soils, groundwater, or surface water were not included in the documents reviewed.

5.4 Impacts on Special Status Areas

The Kilian site is not situated in an area where direct adverse impacts to regulated wetlands or protected streams would likely occur. Onondaga Creek, located approximately 2¼ miles west of the site and the South Branch of Ley Creek, located approximately 1½ miles east of the site, are both Class C water bodies near the location of I-690 (6 NYCRR Part 895.4) and are not considered “protected streams” in this area.

According to the Syracuse East National Wetlands Inventory map (USDOI, 1981), a federal wetland exists approximately 2,200 ft northwest of the Kilian site in Sunnycrest Park and is designated as POWZx (Palustrine, Open Water, Intermittently Exposed, Permanent Excavated). This wetland is at a higher elevation than the Kilian site. A second federal wetland, designated as PEM1A (Palustrine, Emergent, Persistent, Temporary), is located approximately 4,000 ft east of the Kilian site. This wetland is south of I-690. Based on the New York State Freshwater Wetlands map, Syracuse East quadrangle, this wetland area is also a state wetland which is designated SYE 19. It is unlikely that these wetlands have been impacted by the Kilian site via surface water runoff.

As of August 1996, there was one New York State “Natural Heritage Sensitive Element” located within a one-mile radius of the Kilian site. This area is located approximately one-mile east of the Kilian site (south of I-690) and approximately one-half mile southwest of the South Branch of Ley Creek. This area is coincident with state wetland SYE 19 and is unlikely to have been affected by the Kilian site. However, it is not known if groundwater beneath the Kilian site is contaminated. No groundwater, soil, or surface water data were included in the documents reviewed.

6.0 SUMMARY OF CONCERNS

Based on the data and information provided by Kilian, the following concerns are identified:

- Cyanide was identified as a potential contaminant of concern in process wastewater discharged to the sewer due to elevated concentrations detected during OCDDS sampling. Also, a hazardous waste survey indicated the apparent release of 35 gallons per week of cyanide onto the floor of Kilian's main building. Specific containment measures and clean-up actions were not indicated in the documents reviewed. It is possible that the facility generated cyanide waste for 42 years (1939 to 1980) because the date when cyanide was first used was not indicated in the documents reviewed.
- Lead was also identified as a potential contaminant of concern in process wastewater discharged into the sanitary sewer system. Kilian was issued a Notice of Violation in 1995 due to an exceedance of the OCDDS limit for lead. The cause of this exceedance was not identified by Kilian, however, they replaced all of their filters and carbon canisters associated with the ultrafiltration system after the violation. It is possible that elevated levels of lead may have been released into the sewer system at other times during operation of the ultrafiltration system or prior to pretreatment of process wastewater.
- No information was submitted by Kilian regarding disposal of hazardous wastes prior to 1975. Detailed disposal information was submitted for the years 1985 to the present. For the period 1975 to 1985, disposal methods can be identified from the industrial waste and hazardous waste surveys as well as from OCDDS sampling data and industrial waste permits. The lack of information for the period prior to 1975 is of concern because hazardous wastes have potentially been generated at Kilian since

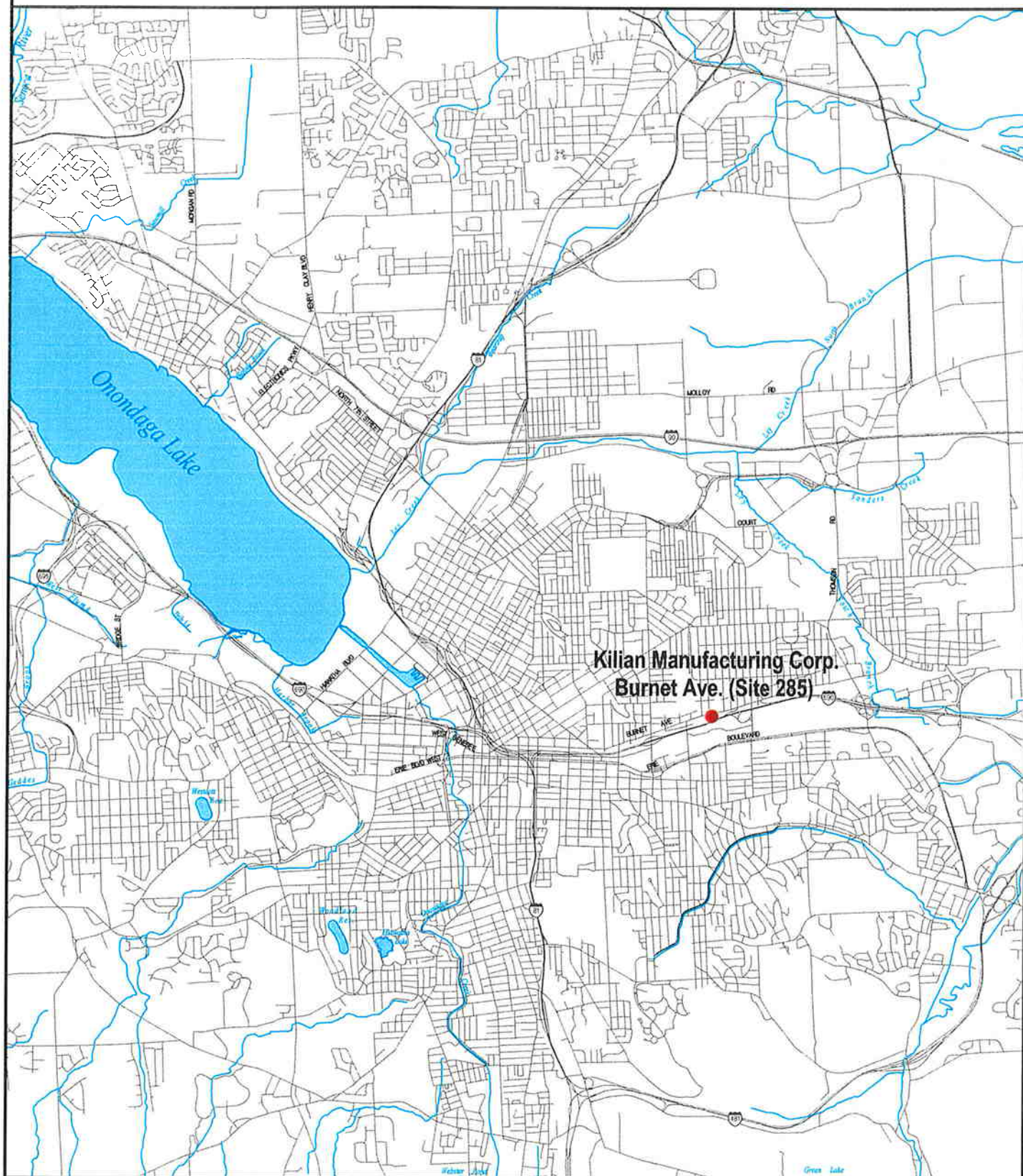
1939 and the disposal methods or facilities were not indicated in the documents reviewed.

- A description of hazardous material and waste storage and handling operations was not provided for present or past years of operation. Storage area characteristics and off-site runoff prevention measures were not discussed in the documents reviewed. With the exception of the apparent historic release of cyanide wastes, the extent of spills that occurred historically on-site is not known.
- The three NYSDEC air permits that were provided indicate that the disposal method for control equipment (cyclone) wastes is “landfill-on site.” Kilian did not provide any information related to this on-site disposal of waste. It is noted that an “open field” is shown on the site maps to the west of the main building (Figures 3 and 4 herein), however, Kilian did not indicate the condition or function of this area.

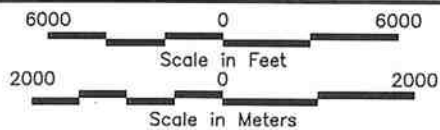
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Site Location: Kilian Manufacturing Corporation



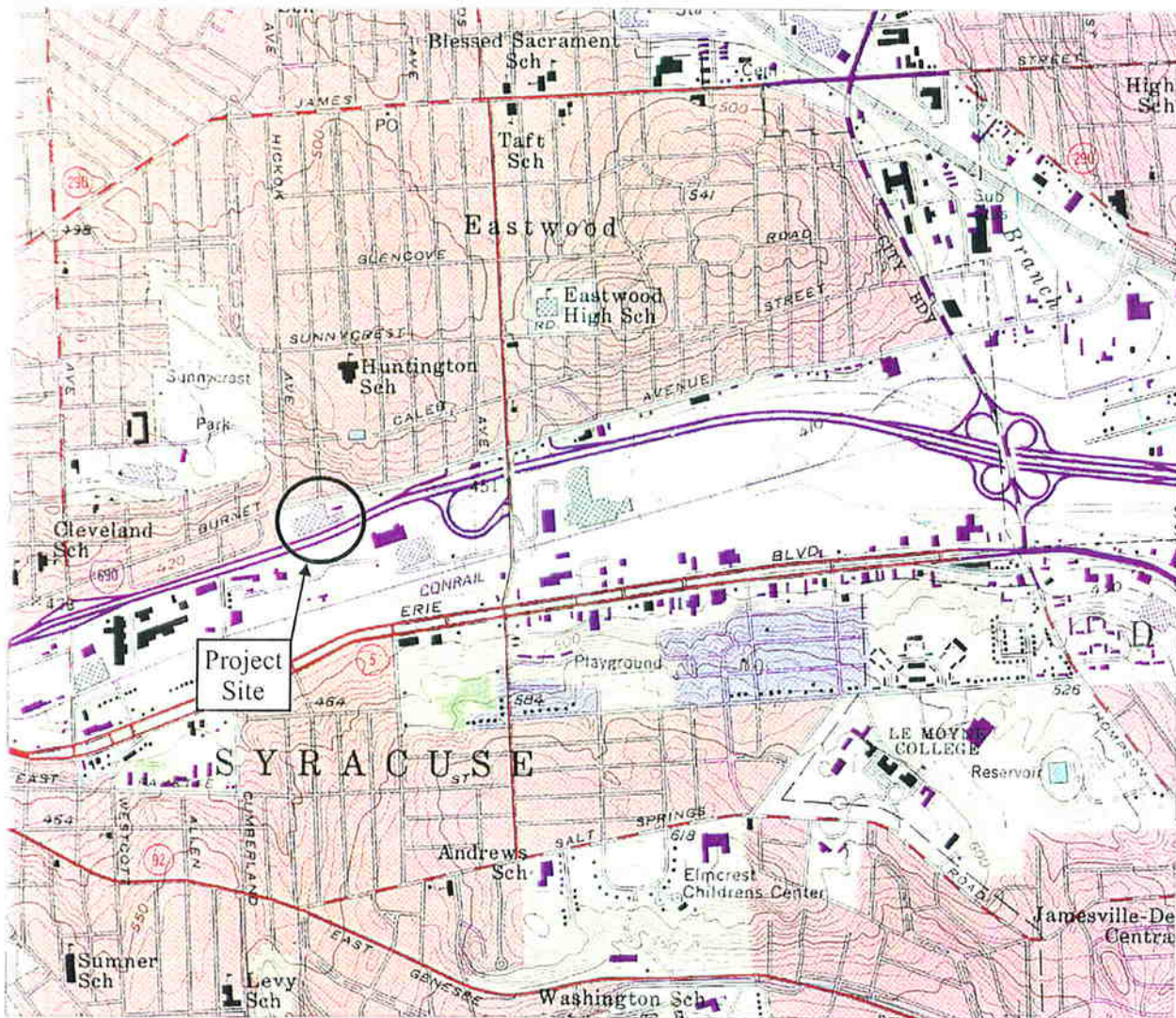
● Site Location with Site ID



TAMS



Figure 1



SCALE 1:24 000



CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS 363 FEET IN ONONDAGA LAKE



United States Geological Survey
Syracuse East Quadrangle
Onondaga County, New York

TAMS

Figure 2
Kilian Manufacturing Facility

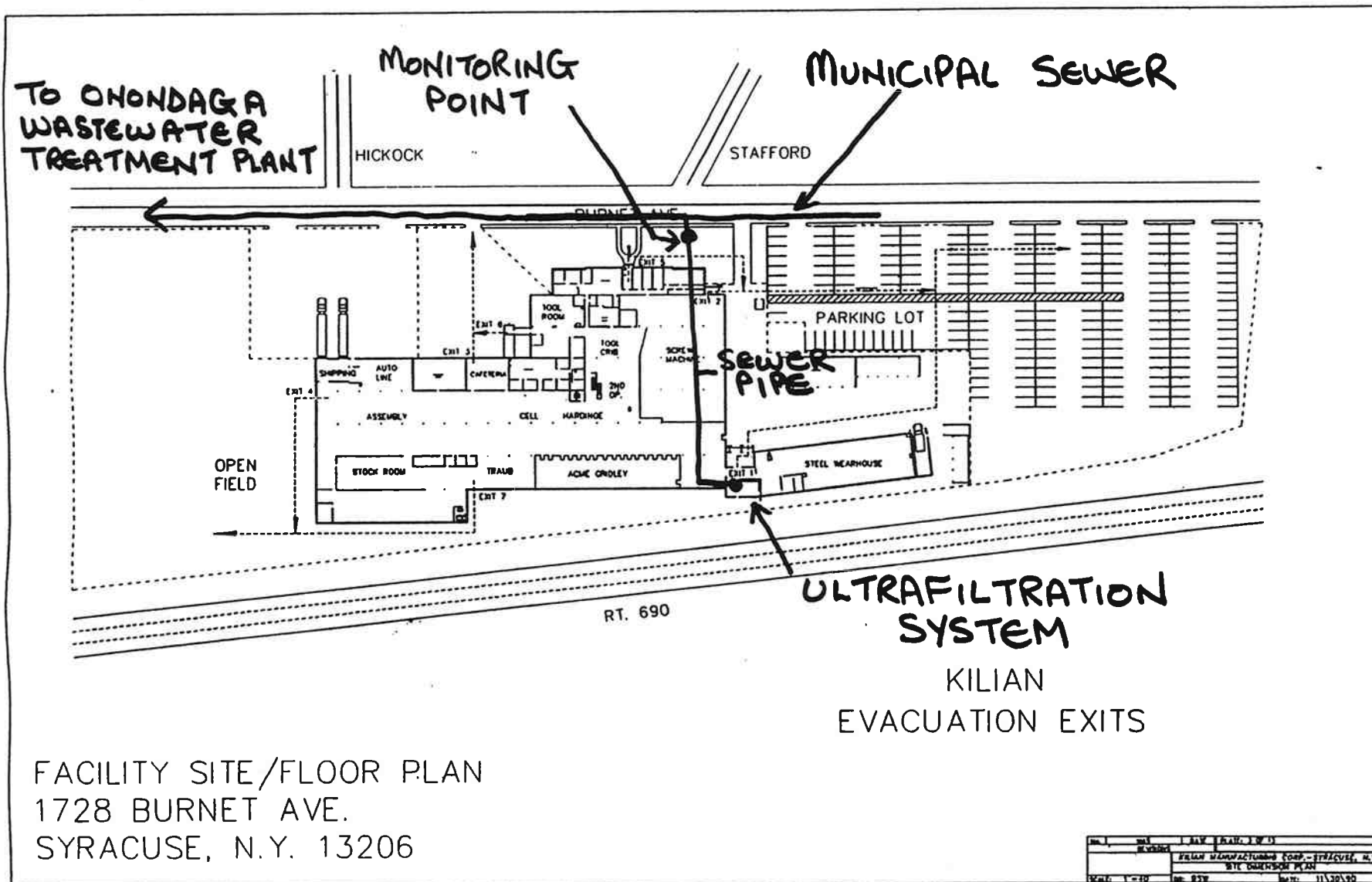


Figure 3: Facility Layout Map

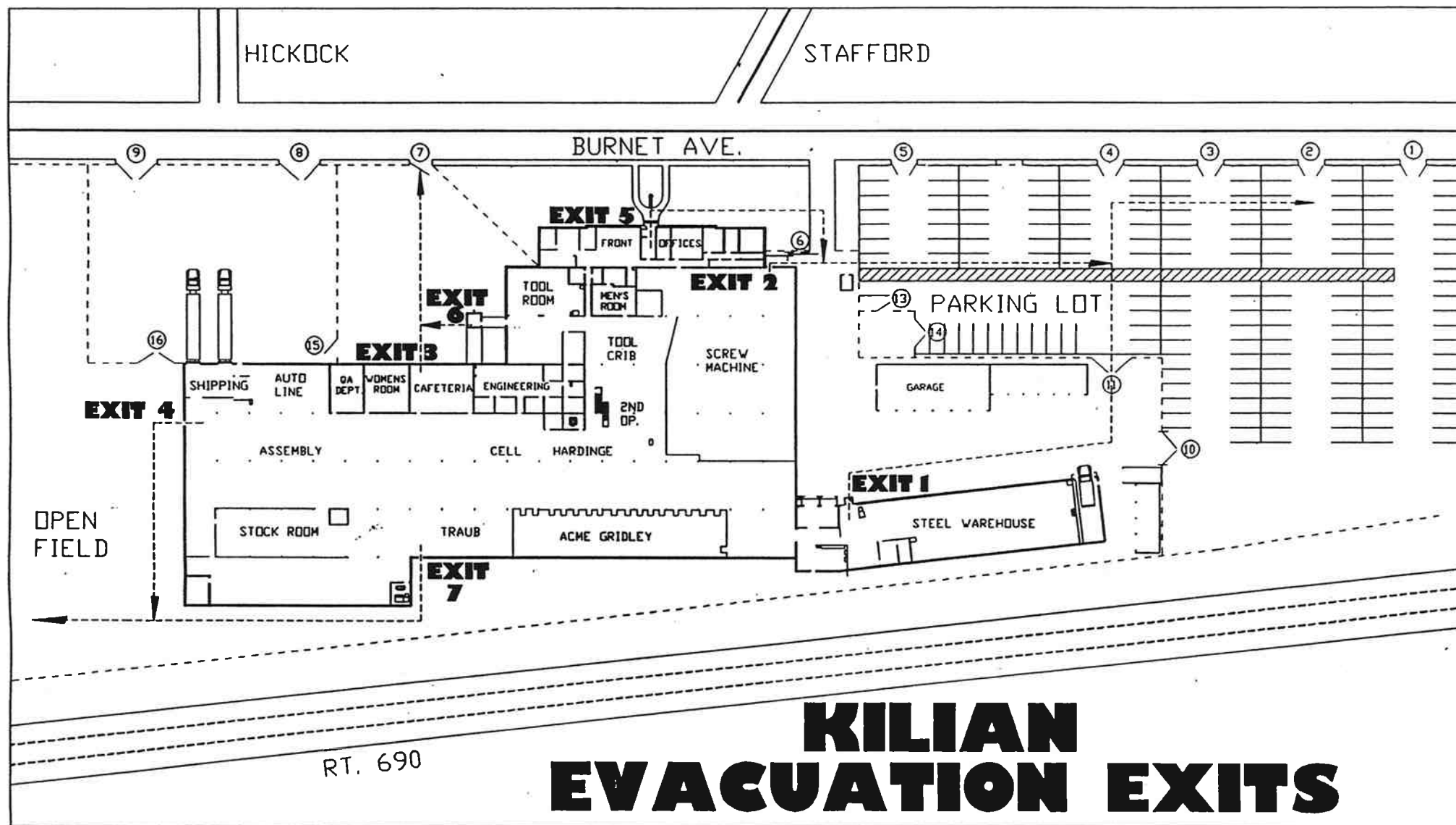


Figure 4: Facility Layout Map